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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,425	04/12/2004	Roger L. Frick	E252.12-0008	2555
164	7590	06/08/2006	EXAMINER	
KINNEY & LANGE, P.A. THE KINNEY & LANGE BUILDING 312 SOUTH THIRD STREET MINNEAPOLIS, MN 55415-1002			ANDERSON, DENISE BROWN	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 06/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/822,425

Applicant(s)

FRICK, ROGER L.

Examiner

Denise B. Anderson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 and 21-36 is/are rejected.
- 7) ☒ Claim(s) 19 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 6/4/04&6/16/05
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Drawings***

The drawings are objected to because two figures have the same label. See figures 11 and 12. Figure 12 has also been labeled as Fig. 11. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

Claims 1, 9, and 24 are objected to because of the following informalities: the recitation "For use with a source of electromagnetic energy" has not been given patentable weight because the recitation occurs in the preamble. A preamble is

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generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). Appropriate correction is required.

Claims 25 and 26 are objected to because of the following informalities: there is insufficient antecedent basis for the phrases “the electromagnetic energy” and “the characteristic”. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

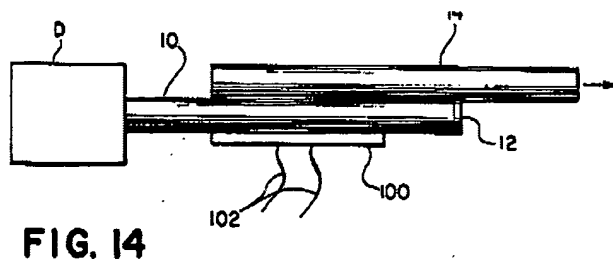
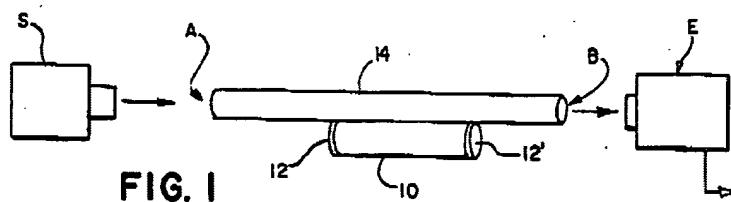
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1-2, 5-7, 9, 11-12, 15-18, 21-22, 24-25, 27-28, and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Hicks, Jr. (USPN 4,758,087).**

As to claims 1, 2, 12, 22, 24, 28 and 36, Hicks, Jr. discloses, in figures 1 and 14, an electromagnetic sensor (resonant cavity 10); disposed to receive electromagnetic energy (from source S); the resonator has a dielectric body (claims 2, 12, and 28) – Neodymium is a dielectric material (column 8, line 13); a sensing surface (bottom surface of fiber cavity 10 is a sensing surface and is connected to a plate 100 for sensing the expansion and contraction of the plate 100); the cavity has a variable gap

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that varies in response to the expansion and contraction of the plate 100 so that diode frequency is shifted (column 10, lines 9-32). See also column 2, lines 18-35. A standing wave is inferred, as it is the nature of a resonator, as defined: "A **cavity resonator** uses resonance to amplify a wave. The cavity has interior surfaces which reflects a wave, usually electromagnetic of a specific frequency. When a wave that is resonant with the cavity enters, it bounces back and forth within the cavity, with low loss (See standing wave). As more wave energy enters the cavity, it combines with and reinforces the standing wave, increasing its intensity." ([http://en.wikipedia.org/wiki/Cavity\\_resonator](http://en.wikipedia.org/wiki/Cavity_resonator)). The evaluator E (figure 1) measures the frequency independence on the physical quantity to be measured. (see also column 4, lines 13-18 and lines 38-48).



As to claims 5, 15 and 18, Fricks Jr. discloses a measurable parameter of pressure (column 2, lines 25-31).

As to claims 6, 16 and 25, Fricks Jr. discloses a measuring apparatus E in figure 1 for measuring the repetition rate (i.e., frequency) of a continuous wave source S.

As to claims 7 and 11, Fricks Jr. discloses, in figure 1, that the resonator 10 is external to the source S.

As to claim 9, Hicks Jr. discloses the features of claim 1, and additionally, that the signal from the sensor is a function of the resonant frequency (column 4, lines 1-4).

As to claim 17, Hicks Jr. discloses the features of claims 1, and additionally, a coupler (mirror M in figure 6) for receiving the energy from source S – the mirror optically connects the source of light S to the fiber 28; a high-Q (i.e., high efficiency) resonator (column 9, lines 11-16); and a dielectric body sensor with is altered in response to change in the temperature or pressure (column 8, line 13 and column 10, lines 9-25). As such, a change in the dielectric infers a change in its dielectric constant.

As to claim 21, Hicks Jr. discloses the features of claim 1 and additionally, altering the ratio of stored electric and magnetic field energy in the standing wave. The examiner interprets that applicant is referring to changing the amplitude (or reinforcing) of the standing wave, as is inherently defined by a resonant cavity and is explained above in the rejection to claim 1.

As to claim 27, Hicks Jr. discloses the features of claim 1 and additionally, a sensor body (fiber 10 in figure 1); and a cavity within the sensor body (cavity 38 in figure 7 in within the fiber 10).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 3 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hicks, Jr. (USPN 4,758,087), as applied to claims 1 and 9 above, and further in view of Pierce (USPN 2,626,990).**

As to claims 3 and 13, Hicks Jr. discloses a resonant cavity 10 in figure 1. Hicks Jr. does not expressly disclose that the cavity comprises a resonant antenna. Pierce discloses a resonant cavity used with a resonant antenna (column 20, lines 20-27). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a resonant antenna as described by Pierce with the resonant cavity of Hicks Jr. for the purpose of obtaining strong coupling.

**Claims 4, 14, 31 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hicks, Jr. (USPN 4,758,087), as applied to claims 1, 9, and 27 above, over Rinard (USPN 6,046,586), as applied to claim 29 below, and further in view of Matsui et al (USPN 6,144,268).**

As to claims 4, 14 and 31, Hicks Jr. discloses a resonant cavity 10 in figure 1. Hicks Jr. does not disclose that the cavity comprises a transmission line. Matsui et al discloses a resonant cavity used with a transmission line (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a

transmission line as described by Matsui et al with the resonant cavity of Hicks Jr. for the purpose of dividing current across multiple portions of the device.

As to claim 34, Hicks Jr. discloses a resonant cavity 10 in figure 1. Hicks Jr. does not expressly disclose that the cavity comprises a port antenna. Matsui et al discloses a resonant cavity used with a port antenna (column 3, lines 39-45). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a port antenna as described by Matsui et al with the resonant cavity of Hicks Jr. for the purpose of dividing current across multiple portions of the device.

**Claims 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hicks, Jr. (USPN 4,758,087), as applied to claims 1 and 9 above, and further in view of Paschotta et al (USPN 6,834,064).**

As to claims 8 and 10, Hicks Jr. discloses a resonant cavity 10 in figure 1 and that the resonator can make use of stimulated emission, inferring that it may be part of a laser cavity. Hicks Jr. does not expressly disclose that the resonator is internal to the cavity of the source. Paschotta et al discloses a resonator inside a mode-locked laser source. It would have been obvious to one of ordinary skill in the art at the time of the invention to place the resonator of Hicks Jr. inside a mode-locked laser source such as described in Paschotta et al for the purpose of monitoring the laser temperature.

**Claims 23, 26, 29-30 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hicks, Jr. (USPN 4,758,087), as applied to claim 1 above, and further in view of Rinard (USPN 6,046,586).**



As to claims 23 and 26, Hicks Jr. discloses the common features of claim 1. Hicks Jr. does not expressly disclose using a pulsed source rather than a continuous wave source for the measurements. Rinard discloses use of pulse electromagnetic energy with a resonant structure. (Column 2, lines 17-29). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a pulsed source and corresponding measuring apparatus, as described in Rinard with the resonant cavities described in Hicks Jr. for the purpose of obtaining higher peak powers.

As to claims 29 and 30, Hicks Jr. discloses that the resonator may be a ring resonator (see column 8, lines 12-24 and figures 12 and 13). Hicks Jr. does not expressly disclose conductors on any of the interior surfaces of the cavity. Rinard discloses conductive walls for the loop resonators/circulators (see abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the conductive walls of Rinard with the ring resonator of Hicks Jr. for the purpose of shielding the resonator walls.

As to claim 35, Hicks Jr. discloses the claimed invention, as described above for claims 28 and 27, except for resonating at suboptical frequencies. Rinard discloses suboptical frequency resonating (microwave resonating described in column 1, line 14). It would have been obvious to one of ordinary skill in the art at the time of the invention to cause the resonator of Hicks Jr. to resonate at suboptical (microwave) frequencies as described by Rinard for the purpose of applying measurements to other areas in which microwaves are primarily used, such as in EPR.

**Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hicks, Jr. (USPN 4,758,087), as applied to claim 27 above, over Rinard (USPN 6,046,586), as applied to claim 29 above, and further in view of Neff (USPN 5,873,840).**

As to claim 32, Hicks Jr. discloses a resonant cavity 10 in figure 1. Hicks Jr. does not disclose that the cavity comprises a slot antenna. Neff discloses a resonant cavity used with a slot antenna (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a slot antenna as described by Neff with the resonant cavity of Hicks Jr. for the purpose of allowing electromagnetic waves to freely pass.

**Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hicks, Jr. (USPN 4,758,087), as applied to claim 27 above, over Rinard (USPN 6,046,586), as applied to claim 29 above, and further in view of Edson (USPN 2,698,923).**

As to claim 33, Hicks Jr. discloses a resonant cavity 10 in figure 1. Hicks Jr. does not disclose that the cavity comprises a dipole antenna. Edson discloses a resonant cavity used with a dipole antenna (column 4, lines 19-29). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a dipole antenna as described by Edson with the resonant cavity of Hicks Jr. for the purpose of picking up microwave energy.

***Allowable Subject Matter***

Claims 19 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 19 is allowable because the prior art of record does not disclose or render obvious the Q-factors associated with the source and outside source resonators in combination with the rest of the limitations of the claims. Claim 20 is allowable because it depends from claim 19.

***FAX/Telephone Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise B. Anderson whose telephone number is 571-272-8324. The examiner can normally be reached on Mon-Fri (9:30 AM - 6 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

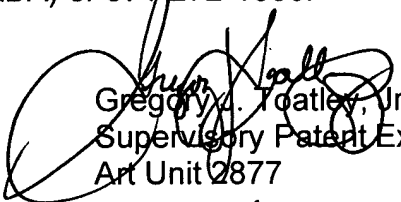
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Denise B Anderson, PhD  
Assistant Patent Examiner  
Art Unit 2877

DBA

Date Signed: 5/25/06

  
Gregory J. Toatley, Jr.  
Supervisory Patent Examiner  
Art Unit 2877

30 May 06